

# LINNAEAN SPECIES OF *CONOPS* (DIPTERA: CONOPIIDAE, MUSCIDAE, SCIOMYZIDAE, SYRPHIDAE, & TACHINIDAE), WITH DESIGNATIONS OF LECTOTYPES<sup>1</sup>

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**ABSTRACT:** Linnaeus described 13 species in the genus *Conops*, which are now placed in the families Conopidae, Muscidae, Sciomyzidae, Syrphidae and Tachinidae. A study is presented of the types and other material of these species in his collection. Lectotypes are designated for 10 names (*C. vesicularis* Linnaeus 1761, *C. macrocephala* Linnaeus 1758, *C. aculeata* Linnaeus 1761, *C. flavipes* Linnaeus 1758, *C. ferruginea* Linnaeus 1761, *C. petiolata* Linnaeus 1761, *C. atomaria* Linnaeus 1767, *C. testacea* Linnaeus 1767, *C. buccata* Linnaeus 1758 & *C. subcoleoprata* Linnaeus 1758). Three new synonyms (*C. macrocephala* = *Physocephala niara* De Geer, *C. petiolata* = *Physocephala rufipes* Fabricius, *C. testacea* = *Myopa extricata* Collin) and one new combination (*C. atomaria* = *Euthycera atomaria*) are proposed.

Names are the keys to knowledge as they serve as short tags for complex objects. In biology, scientific names are tags for species as well as groups of species. These names mean that all organisms that have the same name share at least some characteristics in common. The scientific naming system in biology began with Linnaeus who perfected his system through a series of books that attempted to classify all living things into one natural system. He entitled these works *Systema Naturae*, the system of nature. Subsequent biologists have followed the system established by Linnaeus. So, as our current system of scientific names is derived from Linnaeus, the need exists to re-examine the initial state of the system. This paper does that as that system relates to a small group of flies.

Linnaeus recognized 10 groups (genera) of flies. One of these groups was *Conops*, based on flies that had elongate mouthparts. In his final edition (12th, 1767) of his system of nature, Linnaeus included 13 species in the genus *Conops*. Common farm pests, such as the stable and horn flies, as well as parasites of bees and wasps, scavengers in cow dung, etc., were included in *Conops*. As there is a need to fix the identity of *Conops testacea* Linnaeus (see Camras 1994), all the species that Linnaeus included in *Conops* are reviewed. Fortunately, the actual specimens on which Linnaeus based his species are preserved in London (For details on the Linnaean Collection, its curation and history, see Day & Fitton 1978; on Linnaean insect pins, see Mikkola 1983).

Two Linnaean *Conops* species are currently considered *nomina dubia* (Chvála & Smith 1988). Their identities are here resolved. Linnaeus defined another two *Conops* species broadly, the definitions of these are here restricted

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by lectotype designation. I have designated lectotypes for what are today unique specimens following the recommendation (73F) of the *International Code of Zoological Nomenclature*. Each species included in *Conops* is listed, in the order that it appears in the 12th edition, along with its current status (family, valid name) and an indication of the voucher material available in the Linnaean Collection. For Conopidae, I have followed the species concepts used by Smith (1969) and Chvála (1961, 1963 & 1965).

1) *rostrata* Linnaeus 1758: 604. Syrphidae, *Rhingia rostrata* (Linnaeus). A ♀ and 2 ♂♂. Both ♂♂ are Smith specimens. See Thompson, et alii 1982: 159.

2) *calcitrans* Linnaeus 1758: 604. Muscidae, *Stomoxys calcitrans* (Linnaeus). Lectotype ♂, paralectotypes ♀. See Pont (1981: 168) for designation and full information.

3) *irritans* Linnaeus 1758: 604. Muscidae, *Haematobia irritans* (Linnaeus). Lectotype ♀, paralectotype ♀. See Pont (1981: 169) for designation and full information.

4) *vesicularis* Linnaeus 1761: 468. Conopidae, *Conops vesicularis* Linnaeus. A single ♂, here designated as lectotype. This specimen corresponds to the current concept of the name.

5) *macrocephala* Linnaeus 1758: 604. Conopidae, *Physocephala nigra* (De Geer). A single ♀, which is here designated lectotype. In the most recent catalog (Chvála & Smith 1988: 252), this name is stated to be "probably a senior synonym of *Conops vesicularis* Linnaeus." Much paper was wasted on whether Moses Harris' misidentification (Harris 1776) of this species was an independent proposal, and, hence, a valid name for the species now known as *Rhingia campestris* Meigen 1822 (Collin 1946, 1947, 1948; Goffe 1946, 1947, 1948, 1949). Given the confusion over this epithet, *macrocephala* is best left as a forgotten name and current usage of *nigra* be continued.

6) *aculeata* Linnaeus 1761: 468. Conopidae, *Dalmannia aculeata* (Linnaeus). A single ♂ here designated as lectotype. This specimen corresponds to the current concept of the name.

7) *flavipes* Linnaeus 1758: 604. Conopidae, *Conops flavipes* Linnaeus. A single ♂ with no head is here designated as lectotype. This specimen corresponds to the current concept of the name.

8) *ferruginea* Linnaeus 1761: 468. Conopidae, *Sicus ferrugineus* (Linnaeus). A single ♀ here designated as lectotype. This specimen corresponds to the current concept of the name.

9) *petiolata* Linnaeus 1767: 1005. Conopidae, *Physocephala rufipes* (Fabricius). Three ♂♂, one of these is clearly a specimen subsequently added by Smith as

it is labelled as from "Angl.", another probably also a Smith specimen as it is on a different and non-Linnaean pin. The third ♂ here designated as lectotype.

In 1761, Poda (1761: 118) described *Empis petiolata*, a species that is clearly a conopid. Unfortunately, whether this name applies to a *Conops* or *Physocephala* cannot be determined from the original description and, unfortunately, the types are lost (Thompson & Pont 1994: 37). For pragmatic reasons, I consider Poda's species to belong to the current concept of *Physocephala*. Hence, the Poda name becomes the senior homonym of the Linnaean name. Thus, *Conops rufipes* Fabricius 1781 may remain the valid name for the species first described by Linnaeus as *petiolata*.

Chvála & Smith (1988: 256) list a *Conops petiolata* Donovan (1808: pl. 451) as an available name and a synonym of *rufipes* Fabricius. However, Donovan clearly and correctly identified the Linnaean species giving the appropriate citation to the name in the then most recent edition of the *Systema Naturae* (13th; Gmelin 1790). If subsequent workers had been as careful as Donovan then today I would not have been forced to twist my interpretation of the literature to suppress the Linnaean name and preserve current usage!

10) *atomaria* Linnaeus 1767: 1005. Sciomyzidae, *Euthycera atomaria*, probably a senior synonym for *Euthycera chaerophylli* (Fabricius). A single ♀ remains, but it is in poor condition. The specimen was identified as *Euthycera* by Cogan when the collection was recurated in 1974. As a modern revision of *Euthycera* is needed (Rozkošný 1984), the nomenclatural implication of the identity of this Linnaean name is left for future workers.

11) *testacea* Linnaeus 1767: 1006. Conopidae, *Myopa testacea* (Linnaeus). A single ♀ here designated as lectotype. The specimen agrees with the current concept of *Myopa testacea* of Chvála (1965), but seems to run in Collin (1959) either to *extricata* Collin or *testacea* Linnaeus as the specimen has a mixture of the characteristics used by Collin to distinguish those species. The specimen is clearly reddish anterior to the scutellum and has sparse, inconspicuous black facial pile. The palps are yellow. Unfortunately, David Clements (personal communication), who is revising the genus *Myopa*, has confirmed the specimen to be a pale representative of *extricata* Collin.

The real question of what *testacea* Linnaeus is goes beyond what the syntype in the Linnaean Collection is. Linnaeus also included in his concept of *testacea*, *Sicus ferrugineus* Scopoli and the then unnamed species (potential type of) *Stomoxoides* Schaeffer. When the species *Sicus ferrugineus* Scopoli was included in *Conops*, the epithet was identical to that of Linnaeus' *ferrugineus*. Hence, Linnaeus was forced to rename the species. Thus, specimens of either of the two different species could be designated as the type of the name *Conops testacea* Linnaeus and then the species represented by that type would become the first included species in the genus *Stomoxoides* (and thus becoming the type species of *Stomoxoides* by subsequent monotypy as was recognized by

Coquillett (1910: 609). To maintain current usage, I select the specimen in the Linnaean Collection to be lectotype. This action preserves the current interpretation of *Sicus ferrugineus* Scopoli. The genus group name, *Stomoxoides*, which some authors believe is an available (and valid) name, would become the senior synonym of *Myopa* Fabricius (1775) except as noted below.

There is no basis for the assumption that *Stomoxoides* Schaeffer (Schaeffer 1766b: pl. 120) is an available name. Schaeffer rejected the binominal system of Linnaeus. His work *Elementa Entomologia* is best considered binary<sup>3</sup> as **that was the nomenclatural system he followed in his other works** (for example, his *Icones* [Schaeffer 1766a-1779]). *Elementa* includes no references to species, only orders and genera. The use of *Stomoxoides* in the *Icones* is clearly binary. These species taxa of the *Icones* only received available binominal names from Panzer (1804), but Panzer used *Myopa*, not *Stomoxoides*. One could make a tedious and pedantic argument that since the *Elementa* does not deal with the species category, there is no evidence within the *Elementa* itself as to whether Schaeffer's nomenclature would be consistent with the Principle of Binominal Nomenclature or not, hence new genus-group names are available from it under Article 11c(i). But why do so? The historical record is clear, Schaeffer used a binary system of nomenclature and regardless of whether *Stomoxoides* is available or not, the name will remain a synonym, either an objective junior synonym of *Sicus* or suppressed subjective senior synonym of *Myopa* (see below).

Collin (1959) was undoubtedly correct in identifying the species figured by Schaeffer as *Sicus ferrugineus* Scopoli.

12) *buccata* Linnaeus 1758: 605. Conopidae, *Myopa buccata* (Linnaeus). Three specimens (1 ♂ 2 ♀) are associated with this name, one is apparently a Smith addition, the other two are undoubtedly Linnaean specimens. The one male, associated with the Linnaean name label, is *Myopa fasciata* Meigen. The females are *buccata* of current authors. The female without antennae (one of the Linnaean specimens) is here designated as lectotype and has been so labelled.

13) *subcoleoprata* Linnaeus 1767: 1006. Tachinidae, *Phasia subcoleoprata* (Linnaeus). A single ♂ is present and is clearly a syntype because it is on a Linnaean pin. The specimen belongs to *Phasia* and appears to agree with the current concept.

There are 2 additional specimens in box 23 that are labelled as from old boxes 196 and 197.

The Linnaean species of *Conops* were re-evaluated as there is a question of the status of the genus-group name *Myopa* (Camras 1994). Unfortunately, this

<sup>3</sup> Binary nomenclature is the system of using a uninominal name for the genus and a *polynomial* name for the species.

proposal to the International Commission on Zoological Nomenclature was riddled with errors, many of which have already been noted (Sabrosky 1994, Wheeler 1994). Unfortunately, no one in their rush to resolve an old problem bothered to carefully review what earlier workers had done. Linnaeus always attempted to synthesize all previous work in his *Systema Naturae*. His treatment (fig. 2) of *Sicus*, *Sicus ferrugineus* Scopoli and *Stomoxoides* Schaeffer was reasonable within the context of his times. Had subsequent workers followed Linnaeus, this current work as well as the application (Camras 1994) to the Commission would have been unnecessary.

Beyond the errors noted by Sabrosky and by Wheeler, the following should also be corrected.

Camras and others want to interpret history to be convenient: *Sicus ferrugineus* Scopoli is clearly an independent and new proposal, which has nothing to do with the previously described species, *Conops ferrugineus* Linnaeus. Like all systematists, Scopoli gave citations to earlier use when he cited available names (see for example, under *Sicus buccatus*; fig. 1).

Camras (1994) stated that Fabricius included *Sicus* in the synonymy of *Myopa* when he established *Myopa*, which is a rather generous interpretation of the facts. Fabricius gave no synonymy for genus-group names, but he did equate, in his species synonymy, *Conops ferruginea* Linnaeus with *Sicus ferrugineus* Scopoli. That is, in retrospect, a correct species synonymy, and, thereby, the genus-group names [given the subsequent type-species designation of *Sicus*] are synonyms. However, as noted above, Linnaeus had previously considered his *ferruginea* distinct from Scopoli's.

The statement (Camras 1994) that the genus-group name *Stomoxoides* Schaeffer "was subsequently only" used by Schaeffer is clearly wrong as Linnaeus and Coquillett treated the name as indicated above.

Unless the plenary powers are invoked, the invalid designation of Coquillett (1910: 605) of a non-originally included species (*Conops ferruginea* Linnaeus 1761) as the type species of *Sicus* Scopoli 1763 remains invalid. As there has never been a valid type designation for *Sicus*, I hereby designate the second originally included species, *Sicus ferrugineus* Scopoli 1763, as the type species. This type species is currently recognized by the name *Sicus ferrugineus* (Linnaeus 1761).

If one considers *Stomoxoides* Schaeffer to be an available name (I do not as it appears only in works that are not binominal), then the question remains as to what is its type species. Under the current rules of nomenclature, because the genus name was published without any included species in the sense of named species, the first subsequently included species become the original included species (ICZN, Art. 69a(i)1). By including *Stomoxoides* in the species synonymy of *Conops testacea*, Linnaeus was the first worker to define *Stomoxoides* by subsequent monotypy. As the Linnaean species *testacea* was

## S I C U S.

Os armatum rotro unifeto : vagina rigida,  
porrecta, longa, e medio refracta & inflexa,  
basi palpigera.

1004. *Sicus Ferrugineus*.

— long. lin. 34.

*Diagn.* Antennæ seta brevi laterali. Abdomen teres, incurvum, ferrugineum.

Habitat in pratis, & etiam in sylvis.

Antennæ ferruginæ. Frons aurea. Thorax fusco-rufus. Alæ immaculatæ. Abdomen spiritaliter incurvum. Rotri vagina apice bifida.

1005. *Sicus Buccatus*.

— long. lin. 3.

LINN. Syst. Nat. p. 605. Conops n. 6.

F. un. Svec. 2. 1905.

*Diagn.* Facies vesicularis, alba. Abdomen incurvum pedesque rufi.

In pratis.

Antennæ rufæ, setaræ. Oculi fusci. Alæ puncto medio fusco. Abdomen apice maculis lateralibus cinerascens utrinque (3-4). Pedes rufi. Gena pallidiora.

C c

TAB-

## 1006 INSECTA DIPTERA. Afilus.

testacea. 11. *C. annis setariis testacea*, abdomine subovato hamoso, facie vesiculari alba, alis hyalinis.

*Scop. carn.* 1004. *Sicus ferrugineus*.

*Schaff. elem.* 2. 120. *Stomoxoides*.

*Habitat in Europa australi. Afcanius.*

*Corpus ferrugineum. Abdomen non cylindricum, inflexum. Alæ hyalinae venis ferrugineis. Statura C. buccata.*

buccata. 12. *C. annis setariis*, abdomine hamoso griseo, facie vesiculari alba, alis nebulosis. *F. Svec.* 1905. \*

*Scop. carn.* 1005. *Sicus buccatus*.

*Habitat in Europa.*

subcoleo-  
ptata. 13. *C. annis setariis*, abdomine subferrugineo, alis præmorsis externe crassioribus.

*Habitat Upsaliæ. Carol. Christiernin, p. m. juvenis, Refers insectum coleopteratum. Antenna setaria, uti Caput, Thorax, Pedes musca domestica. Abdomen magis rotundatum, ferrugineum apice nigro. Alæ erectæ, abdomine vix longiores, quasi præmorsa, latissima, crassiores quam in aliis, quasi ustulata ex fusco & albo; unde peregrina facies.*

clearly a composite of at least two species, which was not resolved until the present lectotype designation, the appropriate type species of *Stomoxoides* remains unresolved. As the illustration provided by Schaeffer is clearly of *ferrugineus* Linnaeus 1761 and the first included species is here restricted to *testacea* Linnaeus (*sensu* its lectotype), there is the problem of misidentification of the type species. The International Commission on Zoological Nomenclature needs (under Art. 70b) to rule whether the type is *Sicus ferrugineus* Linnaeus or *Conops testacea* Linnaeus, of which I would recommend the former.

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#### LITERATURE CITED<sup>4</sup>

- Camras, S. 1994. Case 2881. *Sicus* Scopoli, 1763 and *Myopa* Fabricius, 1775 (Insecta, Diptera): proposed conservation by the designation of *Conops buccata* Linnaeus, 1758 as the type species of *Myopa*. Bull. Zool. Nomencl. 51: 31-34.
- Chvála, M. 1961. Czechoslovak species of the subfamily Conopidae (Diptera: Conopidae). Acta Univ. Carol. Biol. 1961: 103-145.
- Chvála, M. 1963. A review of the conopid flies of the genus *Sicus* Scop. (Diptera, Conopidae). Acta Univ. Carol. Biol. 1963: 275-282.
- Chvála, M. 1965. Czechoslovak species of the subfamilies Myopinae and Dalmanniinae (Diptera, Conopidae). Acta Univ. Carol. Biol. 1965: 93-149.
- Chvála, M. and K. G. V. Smith. 1988. Family Conopidae. Pp. 245-272. In Soos, A. (ed.), Catalogue of Palearctic Diptera. Vol. 8, Syrphidae – Conopidae. 363 pp. Akademiai Kiádo, Budapest. [1988.09.20].
- Collin, J. E. 1946. '*Rhinia macrocephala*' not a valid name in Diptera (Syrphidae). Ent. Rec. J. Var. 58: 136-137.
- Collin, J. E. 1947. On suggested proposals for altering the names of two species of Syrphidae (Diptera), and on alterations in entomological names generally. Ent. mon. Mag. 83: 274-276. [1947.11.28]
- Collin, J. B. 1948. On the interpretation of Article 31 of the International Rules of Nomenclature. Ent. mon. Mag. 84: 235-236. [1948.10.11].
- Collin, J. E. 1959. The British species of *Myopa* (Dipt., Conopidae). Ent. mon. Mag. 95: 145-151. [after 1959.09.10].
- Coquillett, D. W. 1910. The type-species of the North American genera of Diptera. Proc. U. S. nat. Mus. 37: 499-647. [1910.08.04].
- Day, M. C. and N. G. Fitton. 1978. Re-curation of the Linnaean Hymenoptera (Insecta), with a reassessment of the taxonomic importance of the collection. Biol. J. Linnaean Soc. 10: 181-198.

<sup>4</sup> Titles and other details for older works are abbreviated; full titles and information on these works can be found in Thompson & Pont.

- Donovan, E.** 1808. The natural history of British insects ... vol. 13, 74 + 4 pp., pls. 433-468. Rivington, London.
- Gmelin, J. F.** 1790. Caroli a Linne, Systema naturae ... 13th ea., vol. 1 (5): 225-3020. G. E. Beer, Lipsiae [=Leipzig].
- Goffe, E. R.** 1946. The Syrphidae (Diptera) of Moses Harris, 1776. Ent. mon. Mag. 82: 67-86. [1946.03.30].
- Goffe, E. R.** 1947. Some notes on Syrphidae (Diptera). Ent. mon. Mag. 83: 195-197. [1947.08.28].
- Goffo, E. R.** 1948. *Musca macrocephala* Harris, 1776, and *Scaeva arcuata* Fallen, 1817 (Dipt., Syrphidae). Ent. mon. Mag. 84: 53-55. [1948.04.01].
- Goffe, E. R.** 1949. The position of *Musca macrocephala* Harris, 1776, and of certain other names of Syrphidae (Diptera) under Article 31 of the Rules. Ent. mon. Mag. 85: 35-37. [1949.03.11].
- Harris, M.** 1776. An exposition of English insects ... Decad III, pp. 73-99, pls. 21-30. Robson Co., London.
- Linnaeus, C.** 1758. Systema naturae ... Ed. 10, Vol. 1. 824 pp. L. Salvii, Holmiae [=Stockholm]. [1758.01.01].
- Linnaeus, C.** 1761. Fauna Svecica ... Editio altera, auctior [49] + 578 pp., 2 pls. L. Salvii, Stockholmiae [= Stockholm]. (after 1761.07.28, date of preface).
- Linnaeus, C.** 1767. Systema naturae ... Ed. 12 (revised.). Vol. 1, Pt. 2, pp. 533-1327. L. Salvii, Holmiae [=Stockholm]. [1767.06.14].
- Mikhola, R.** 1983. Diagnostic insect pins: Some problems of the Linnaean insect collection solved. Antenna 7: 16-17.
- Panzer, G. W. F.** 1804. D. Jacobi Christiani Schaefferi Iconum Insectorum circa Ratisbonam indigenorum Enumeratio Systematica. xvi + 260 pp. Palmii, Erlangae [= Erlangen].
- Poda [von Neuhaus], N.** 1761. Insecta mused Graecensis ... 127 + [xii] pp., 2 pls. Widmanstadii, Graecii [= Graz] [1761.09.03].
- Pont, A. C.** 1981. The Linnaean species of the families Fannidae, Anthomyiidae and Muscidae (Insecta: Diptera). Biol. J. Linnaean Soc. 15: 165-175. [1981.02.23].
- Rozkošný, R.** 1984. The Sciomyzidae (Diptera) of Fennoscandia and Denmark. Fauna Ent. Scand. 14, 224 pp.
- Sabrosky, C. W.** 1994. Comments on the proposed conservation of *Sicus* Scopoli, 1763 and *Myopa* Fabricius, 1775 by the designation of *Conops buccata* Linnaeus, 1758 as the type species of *Myopa* (Insecta, Diptera), and on the proposed rejection of *Coenomyia* Latreille, 1796. Bull. Zool. Nomencl. 51: 259-260.
- Schaeffer, J. C.** 1766a. Icones Insectorum ... 3 vole., xx + 280 + xiv pp., 280 pls. Breitfeld, Regensburg.
- Schaeffer, J. C.** 1766b. Elementa Entomologica. [7 + 8 + 17 pp.,] + 135 plates with facing legends. Weissianis, Regensburg.
- Scopoli, J. A.** 1763. Entomologia carniolica ... 421 pp. Trattner, Vindobonae [=Vienna] [before 1763.06.23].
- Smith, K. G. V.** 1969. Diptera. Conopidae. Handbk ident. Brit. Ins. 10 (3a), 19 pp. [1969.03.04].
- Thompson, F. C. and A. Pont.** 1994. Systematic database of *Musca* names (Diptera). Theses Zool. 20, 221 pp.
- Thompson, F. C., J. R. Vockeroth and M. C. D. Speight.** 1982. The Linnaean species of flower flies (Diptera: Syrphidae). Mem. ent. Soc. Washington 10: 150-165 [1982.09.30].
- Wheeler, T. A.** 1994. Comments on the proposed conservation of *Sicus* Scopoli, 1763 and *Myopa* Fabricius, 1775 by the designation of *Conops buccata* Linnaeus, 1758 as the type species of *Myopa* (Insecta, Diptera), and on the proposed rejection of *Coenomyia* Latreille, 1796. Bull. Zool. Nomencl. 51: 260-261.